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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,302	04/08/2004	Hilde Grude Borgos	60.1531	7440
37003	7590	03/10/2006	EXAMINER	
SCHLUMBERGER-DOLL RESEARCH 36 OLD QUARRY ROAD RIDGEFIELD, CT 06877-4108			HUGHES, SCOTT A	
			ART UNIT	PAPER NUMBER
			3663	
DATE MAILED: 03/10/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/820,302	Applicant(s) BORGOS ET AL.	
	Examiner Scott A. Hughes	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments, see Remarks, filed 12/14/2005, with respect to the 35 USC 112 rejection of claim 7 have been fully considered and are persuasive.

Applicant's amendment to claim 7 overcomes the 35 USC 112 rejection of the previous action, and this rejection is withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-21 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Independent claims 1, 20 and 21 include the limitation of "deriving coefficients from a single data point." This limitation is broad enough to read on deriving coefficients from any type of data point from any data. As claimed, the limitation is broad enough that the single data point is not limited to the seismic data or seismic data waveform recited earlier in the claim. This single data point could be any single point of any data. In the

specification (see paragraphs [0026] and [0027]), applicant describes a process by which the coefficients are derived at a “single extrema data point” and “one single data point. In particular, if derivatives are obtained only at extrema points.” Therefore, the specification enables deriving coefficients only at single extrema data points, but not at any type of single data point as is claimed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 13-15, and 18-21, as best understood by the examiner, are rejected under 35 U.S.C. 102(b) as being anticipated by Sonneland.

With regards to claim 1, 20, and 21, Sonneland discloses a method of processing and interpreting seismic data. Sonneland discloses a computer system and a computer product that have means for carrying out the method. Sonneland discloses identifying a plurality of extrema positions associated with the seismic data, deriving coefficients that characterize the seismic data waveform, from a single data point, in the vicinity of the extrema positions, and forming groups of the extrema positions where the coefficients are similar (Figs. 4-5) (Column 5, Line 46 to Column 6, Line 8; Column 1; Columns 3-4). Sonneland shows groups of extrema positions where the coefficients are similar in Fig. 4. The claim language is broad enough that any grouping of extrema positions where

the coefficients have any type of similarity reads on the claim. Sonneland discloses using an observed seismic signal to derive the coefficients. Because this signal includes points in the vicinity of extrema positions, it reads on the claim limitation of deriving coefficients that characterize the seismic data waveform, from a single data point, in the vicinity of said extrema positions. An observed signal includes a plurality of single data points, which make up the signal. The claim language is broad enough that as long as a single data point is included in the derivation, the prior art reads on the claim. The claim limitation "from a single data point" does not exclude the use of other data points or a plurality of data points as long as a single point is included in the data. The limitation only requires that a single data point be used.

With regard to claim 2, Sonneland discloses that he extrema positions are identified with sub-sample precision (Column 4, Lines 20-33).

With regard to claim 3, Sonneland discloses that the coefficients are derivatives (Column 1, Lines 25-57).

With regard to claim 4, Sonneland discloses that the derivatives are determined using orthogonal polynomials and the derivatives allow local reconstructions of seismic traces in the vicinity of the extrema positions to be obtained using Taylor series expansions (Columns 1, 3-4).

With regard to claim 5, Sonneland discloses that the seismic data is subjected to orthogonal polynomial spectral decomposition and the extrema positions are identified based on the decomposed seismic data (Columns 1, 3).

With regard to claim 6, Sonneland discloses that the orthogonal polynomial spectral decomposition comprises volume reflection spectral decomposition with Chebyshev polynomials used as the basis functions (Columns 1, 3).

With regard to claim 13, Sonneland discloses defining a volume of interest within the seismic data (abstract; Columns 1, 4).

With regard to claim 14, Sonneland discloses that the volume of interest comprises a vertical window of constant thickness or a volume between two pre-determined seismic horizons (Column 4, Line 27 to Column 6, Line 34).

With regard to claim 15, Sonneland discloses that horizon segments are extracted on opposite sides of input fault surfaces (Column 5, line 48 to Column 6).

With regard to claim 18, Sonneland discloses that the groups of extrema positions are used to create a horizon interpretation (Column 5, Line 45 to Column 6, Line 40).

With regard to claim 19, Sonneland discloses that the groups of extrema positions are used to extract a seismic volume containing multiple reflectors having similar seismic response (Column 5, Line 45 to Column 6, Line 40).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonneland as applied to claims 1-6, 13-15, and 18-19 above and further in view of Hildenbrand.

With regard to claims 8-11, Sonneland does not disclose that the groups of extrema positions are formed using supervised classification. Sonneland discloses that the coefficients of the extrema values can be used in determining fault locations and other geological features (Column 5, Lines 48-68). Sonneland discloses that sorting rules are given to a computer to identify and isolate the features, and that synthetic traces can be used to help classify the data (Columns 5-6). Sonneland does not disclose using supervised or unsupervised classification for the positions of the extrema points. Hildenbrand discloses that it is known to use supervised and unsupervised classification in determining horizons and faults (Columns 1-3) using extrema values. It would have been obvious to modify Sonneland to include using either supervised or unsupervised classification with the seed points and number of classes provided by a user as taught by Hildenbrand in order to generate a horizon map of a survey area.

With regard to claim 12, Sonneland Hildenbrand discloses that seed points for the unsupervised classification are selected at random and small spatially contiguous horizon segments are extracted locally around the seed points (Columns 3-6).

Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonneland as applied to claims 1-6, 13-15, and 18-19 above and further in view of Stark.

With regard to claims 16 and 17, Sonneland does not disclose that fault displacement estimates are determined using the extracted horizon estimates or that the fault displacement is broken into throw and heave components. Stark discloses that selected positions can be used in horizon estimates to calculate the throw and heave of a volume (pages 8-11). Sonneland discloses estimating volumes from the selected extrema points, and discloses that these estimates can be used for detecting reflectors, fractures, and other geological features in a survey (Columns 5-6). It would have been obvious to modify Sonneland to include calculating the throw and heave of the detected fault locations from the estimated horizons in order to be able to study the movement of hydrocarbons in a formation through fault movement.

Conclusion

The cited prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A. Hughes whose telephone number is 571-272-6983. The examiner can normally be reached on M-F 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



SAH



JACK KEITH
SUPERVISORY PATENT EXAMINER